4.10 NOISE

This section evaluates both temporary noise impacts associated with construction activity and long-term noise impacts associated with residential use of the Project site. Additionally, noise impacts to sensitive receptors on the Project site and vibration from off-site sources is studied. The analysis herein is based partially on the *Environmental Noise Study Report* prepared by Dudek for the project site on May 21, 2014.

4.10.1 Setting

a. Overview of Sound Measurement. Noise level (or volume) is generally measured in decibels (dB) using the A-weighted sound pressure level (dBA). The A-weighting scale is an adjustment to the actual sound pressure levels to be consistent with that of human hearing response, which is most sensitive to frequencies around 4,000 Hertz (about the highest note on a piano) and less sensitive to low frequencies (below 100 Hertz). In addition to the instantaneous measurement of sound levels, the duration of sound is important since sounds that occur over a long period of time are more likely to be an annoyance or cause direct physical damage or environmental stress. One of the most frequently used noise metrics that considers both duration and sound pressure level is the equivalent noise level (Leq). The Leq is defined as the single steady A-weighted level that is equivalent to the same amount of energy as that contained in the actual fluctuating levels over a period of time. Typically, Leq is summed over a one-hour period.

The sound pressure level is measured on a logarithmic scale with the 0 dB level based on the lowest detectable sound pressure level that people can perceive (an audible sound that is not zero sound pressure level). Decibels cannot be added arithmetically, but rather are added on a logarithmic basis. Based on the logarithmic scale, a doubling of sound energy is equivalent to an increase of 3 dB and a sound that is 10 dB less than the ambient sound level would result in a negligible increase (less than 0.5 dB) in total ambient sound levels. Because of the nature of the human ear, a sound must be about 10 dB greater than the reference sound to be judged as twice as loud. In general, a 3 dB change in community noise levels is noticeable, while 1-2 dB changes generally are not perceived. Quiet suburban areas typically have noise levels in the range of 40 to 50 dBA, while those along arterial streets are in the 50 to 60+ dBA range. Normal conversational levels are in the 60-65 dBA range and ambient noise levels greater than that can interrupt conversations.

Noise levels typically attenuate at a rate of 6 dB per doubling of distance from point sources such as industrial machinery. Noise from lightly traveled roads typically attenuates at a rate of about 4.5 dB per doubling of distance, while noise from heavily traveled roads typically attenuates at about 3 dB per doubling of distance. Noise from a point source typically attenuates at about 6 dBA per doubling of distance. Noise levels may also be reduced by intervening structures; generally, a single row of buildings between the receptor and the noise source reduces the noise level by about 5 dBA, while a solid wall or berm that breaks the line-of-sight reduces noise levels by 5 to 10 dBA. The Federal Transit Administration's (FTA) *Transit Noise and Vibration Impact Assessment* indicates that the manner in which newer buildings in California are constructed generally provides a reduction of exterior-to interior noise levels of about 25 dBA with closed windows (May 2006). The *Environmental Noise Study Report* prepared by Dudek for the project site (May 2014) finds that standard construction materials and techniques used for residential developments in Southern California (conventional wood frame construction consistent with current California energy conservation requirements) normally result in a

minimum exterior-to-interior noise attenuation of 15 dBA with windows open and 20 dBA with windows closed.

The time period in which noise occurs is also important since noise that occurs at night tends to be more disturbing than that which occurs during the daytime. To evaluate community noise on a 24-hour basis, the day-night average sound level was developed (Ldn). Ldn is the average of all A-weighted levels for a 24-hour period with a 10 dB upward adjustment added to those noise levels occurring between 10:00 PM and 7:00 AM to account for the general increased sensitivity of people to nighttime noise levels. The Community Noise Equivalent Level (CNEL) is identical to the Ldn with one exception. The CNEL adds 5 dB to evening noise levels (7:00 PM to 10:00 PM). Thus, both the Ldn and CNEL noise measures represent a 24-hour average of A-weighted noise levels with Ldn providing a nighttime adjustment and CNEL providing both an evening and nighttime adjustment.

b. Noise Sources. The project site is located south of U.S. 101 and the Union Pacific Railroad (UPRR) tracks and east of S. Los Carneros Road. The project site is also in an area characterized primarily by residential and industrial development. Consequently, noise sources affecting noise levels onsite and in the project site vicinity include traffic noise, railroad noise, and noise associated with industrial operations.

Railroad Noise. Passenger and freight operations occur along the UPRR, which parallels and is just south of the U.S. 101 corridor. The railroad roughly bisects the City in an east-west direction. Based on information provided in the City of Goleta General Plan Noise Element 2006 and Amtrak's online train schedule, daily rail operations include 12 freight trains with 3 occurring at night, and 9 passenger trains with all occurring during the day (Westar Mixed-Use FEIR, City of Goleta 2012). The maximum instantaneous sound of passing trains ranges from 96 to 100 dBA at 100 feet from the tracks, and the average sound level ranges from 70 to 75 dBA CNEL. The combined noise sources of the railway and U.S. 101 result in a 300- to 600-foot-wide east-west corridor where noise levels equal or exceed 70 dBA CNEL and produce noise levels equal to or exceeding 60 dBA CNEL in a corridor that is roughly three times the width of the 70+ dBA CNEL corridor (Goleta General Plan Noise Element, 2006).

c. Current Noise Levels. The Noise Element of the Goleta General Plan shows the northern half of the project site as being within the 65 dBA CNEL noise contour for U.S. 101 and the remainder of the project site as being within the 60 dBA CNEL noise contour. The Noise Element also shows the northern part of the project site as within the 70 dBA CNEL noise contour for the railroad, the central part of the project site as within the 65 dBA CNEL noise contour, and the southern part of the project site as within the 60 dBA CNEL noise contour.

As part of the Dudek study, the existing noise environment at the site was monitored on Thursday through Friday, March 13–14, 2014. One short-term (6-minute duration) noise measurement and one long-term (24-hour duration) noise measurement was conducted on site. Both measurements were conducted in the same location, adjacent to the northern project boundary, approximately 500 feet east of S. Los Carneros Road. During the short-term noise measurement, traffic on U.S. 101 was counted and noted. The traffic counts and the short-term noise level data were used to calibrate the traffic noise model (refer to Appendix H for measurement device details and methodology).

During the short-term noise measurement, the principal contributor to the ambient noise environment at the project site was traffic noise from the U.S. 101. The U.S. 101 traffic was observed to move smoothly during the measurements. Other noise sources observed during the measurements included distant construction noise. No trains passed by the site during the short-term noise measurement,

although rail noise was a contributor during the long-term noise measurement. The noise level measurement results are presented in Table 4.10-1.

Table 4.10-1
Noise Measurement Results

Location	Date/Time	Measured Ambient Noise (dBA)	
		Leq [1]	CNEL [2]
Adjacent to northern project boundary, approximately mid-site in east-west direction	3/13/2014 1:10 PM - 1:16 PM	54 dBA	n/a
	3/13/2014 2:00 PM - 3/14/2014 2:00 PM	62 dBA	67 dBA

Notes: Weather conditions: Temperature 64 degrees F; 69% Relative humidity; partly cloudy skies; 2 mph southerly wind.
One 6-minute measurement and one 24-hour measurement was taken using an integrating sound level meter.
1. Leq is essentially the average sound level over the measurement period.
2. CNEL is the average sound level over a 24-hour period
Source: Dudek, 2014

Measured onsite noise levels are lower than what is shown in the Noise Element of the General Plan. This is because the generalized noise contours developed as part of the Noise Element do not account for site-specific conditions that affect noise propagation. Site-specific factors that reduce noise from U.S. 101 and the UPRR on the project site include topographic features which obstruct noise transmission, such as the U.S. 101 onramp at S. Los Carneros Road, which serves as a partial barrier that reduces noise from U.S. 101, and S. Los Carneros Road, which serves as a partial barrier to approaching and departing vehicle traffic on U.S. 101 as well as rail traffic on the UPRR line.

d. Sensitive Noise Receptors. The General Plan Noise Element defines sensitive receptors as users or types of uses that are interrupted (rather than merely annoyed) by relatively low levels of noise. These include: residential neighborhoods, schools, libraries, hospitals and rest homes, auditoriums, certain open space areas, and public assembly places. Uses in the immediate vicinity of the project site consist primarily of residential and industrial development. Sensitive receptors near the project site include residential uses (Willow Spring I and II) south of the project site across Camino Vista. In addition, an additional residential development has been approved to the west of the project site, beyond S. Los Carneros Road. This development would be considered a noise sensitive use.

e. Fundamentals of Groundborne Vibration. Vibration is sound radiated through the ground. The rumbling sound caused by the vibration of room surfaces is called groundborne noise. The ground motion caused by vibration is measured as particle velocity in inches per second and, in the U.S., is referenced as vibration decibels (VdB).

The background vibration velocity level in residential areas is usually around 50 VdB. The vibration velocity level threshold of perception for humans is approximately 65 VdB. A vibration velocity level of 75 VdB is the approximate dividing line between barely perceptible and distinctly perceptible levels for many people. Most perceptible indoor vibration is caused by sources within buildings, such as operation of mechanical equipment, movement of people, or the slamming of doors. Typical outdoor sources of perceptible groundborne vibration are construction equipment, steel-wheeled trains, and traffic on rough roads. If a roadway is smooth, the groundborne vibration from traffic is rarely perceptible. The range of interest is from approximately 50 VdB, which is the typical background vibration velocity level, to 100 VdB, which is the general threshold where minor damage can occur in fragile buildings.

The general human response to different levels of groundborne vibration velocity levels is described in Table 4.10-2.

Table 4.10-2
Human Response to Different Levels of Groundborne Vibration

Vibration Velocity Level	Human Reaction
65 VdB	Approximate threshold of perception for many people.
75 VdB	Approximate dividing line between barely perceptible and distinctly perceptible. Many people find transit vibration at this level annoying.
85 VdB	Vibration acceptable only if there are an infrequent number of events per day.
90 VdB	Difficulty with tasks such as reading computer screens.

Source: FTA, 2006.

f. Regulatory Setting. The Noise Element of the Goleta General Plan establishes noise standards for various land use categories based on the U.S. Department of Housing and Urban Development Guidelines and standards from the California Office of Noise Control. The City recommends 50-60 dBA as the "normally acceptable" range and 60-65 dBA as the "conditionally acceptable" range for multi-family residential uses. According to the Goleta General Plan, multi-family residences within the "normally acceptable range" are deemed satisfactory, based upon the assumption that any buildings involved are of normal conventional construction, without any special noise insulation requirements. Development of multi-family residences within the "conditionally acceptable" range should be undertaken only after a detailed analysis of the noise reduction requirements is made and needed noise insulation features are included in the design.

Table 4.10-3 shows the noise and land use compatibility criteria in the City's Noise Element.

Table 4.10-3
Goleta Noise and Land Use Compatibility Criteria

Land Use Category	Community Noise Exposure (Ldn or CNEL, dBA)			
	Normally Acceptable	Conditionally Acceptable	Normally Unacceptable	Clearly Unacceptable
Residential - low density	50-60	60-65	65-75	75-85+
Residential – multiple family	50-60	60-65	65-75	75-85+
Transient Lodging – motels and hotels	50-65	65-70	70-80	80-85+
Schools, libraries, churches, hospitals, and nursing homes	50-60	60-65	65-80	80-85+
Auditoriums, concert halls, and amphitheaters	NA	50-65	NA	65-85+

Table 4.10-3
Goleta Noise and Land Use Compatibility Criteria

Land Use Category	Community Noise Exposure (Ldn or CNEL, dBA)			
	Normally Acceptable	Conditionally Acceptable	Normally Unacceptable	Clearly Unacceptable
Sports arenas and outdoor spectator sports	NA	50-70	NA	70-85+
Playgrounds and neighborhood parks	50-70	NA	70-75	75-85+
Golf courses, riding stables, water recreation, and cemeteries	50-70	NA	70-80	80-85+
Office buildings, business commercial, and professional	50-67.5	67.5-75	75-85+	NA
Industrial, manufacturing, utilities, and agriculture	50-75	70-75	75-85+	NA

Source: Table 9-2, Noise Element, Goleta General Plan (September 2006)
Normally Acceptable: *Specified land use is satisfactory, based upon the assumption that any buildings involved are of normal conventional construction, without any special noise insulation requirements.*
Conditionally Acceptable: *New construction or development should be undertaken only after a detailed analysis of the noise reduction requirements is made and needed noise insulation features are included in the design. Conventional construction, but with closed windows and fresh air supply systems or air conditioning, will normally suffice.*
Normally Unacceptable: *New construction or development should be discouraged. If new construction or development does proceed, a detailed analysis of the noise reduction requirements shall be made and needed noise insulation features shall be included in the design.*
Clearly Unacceptable: *New construction or development should generally not be undertaken.*
NA: *Not applicable.*

According to Noise Element policy NE 1.1, the City requires mitigation for development that would subject proposed land uses to noise levels that exceed the acceptable levels shown in Table 4.10-2. Policy NE 1.2 requires new development in areas over 60 dBA CNEL to include mitigation to reduce interior noise levels to 45 dBA CNEL or less. The Noise Element also restricts construction activities near or adjacent to residential buildings and other sensitive receptors to the hours of 8:00 AM to 5:00 PM Monday through Friday and 7:00 AM to 4:00 PM Monday through Friday for construction in nonresidential areas (Policy NE 6.4). Noise Element Policy NE 6.5 requires noise mitigation for construction equipment.

The Goleta Municipal Code (GMC) Chapter 9.09 regulates noise in the City. The purpose of the Chapter is to preserve public peace and comfort for citizens of Goleta from unwarranted noise and disturbances. The GMC prohibits loud and unreasonable noise between the hours of 10:00 PM and 7:00 AM Sunday through Thursday and between 12:00 midnight and 7:00 AM Friday and Saturday. Loud and unreasonable noise is defined as sound which is clearly discernible at a distance of 100 feet from the property line of the property upon which it is broadcast or sound which is above 60 dBA at the edge of the property line upon which the sounds is broadcast. The City does not have any code requirements related to noise from construction activities but the GMC noise regulations would apply to construction noise.

4.10.2 Impact Analysis

a. Methodology and Significance Thresholds. The future noise levels at the project area building facades and the outdoor recreational areas (pools areas, park) were calculated using the Federal Highway Administration's (FHWA) Traffic Noise Model (TNM v. 2.5). Noise modeling data sheets can be viewed in Appendix H. The model calculations are based on traffic data from the project traffic study performed by Associated Transportation Engineers (ATE) (see Appendix I) and Caltrans traffic counts (http://traffic-counts.dot.ca.gov/). Cumulative conditions correspond to the assumed buildout of pending development within the City as indicated in Section 3.0, *Environmental Setting*, Tables 3-1 and Table 3-2. The traffic noise model was calibrated using the short-term sound level measurement shown in Table 1. The difference between the monitored and calibrated noise levels is less than 1 dBA, which is within the acceptable margin-of-error of noise monitoring equipment and modeling programs.

Based upon Section 2.0, *Project Description*, a planned eight-foot masonry wall height along the northern and western project boundaries was included in the noise model.

Noise associated with rail activities on the adjacent UPRR line was based on information provided in the City of Goleta General Plan Noise Element 2006 Estimates of rail operations (12 freight trains with 3 occurring at night, and 9 passenger trains with all occurring during the day) were obtained from the Westar Mixed-Use FEIR (City of Goleta, 2012) and Amtrak's online train schedule. According to the City of Goleta General Plan Noise Element 2006, passenger and freight operations long the UPRR comprise another source of transportation-related noise. The maximum instantaneous sound level of passing trains ranges from 96 to 100 dBA at 100 feet from the tracks, and the average sound level ranges from 70 to 75 dBA CNEL. The combined noise sources of the railway and U.S. 101 result in a 300- to 600-foot-wide east-west corridor where noise levels equal or exceed 70 dBA CNEL and produce noise levels equal or exceeding 60 dBA CNEL in a corridor that is roughly three times the width of the 70+ dBA CNEL corridor.

Overall onsite noise levels were calculated by standard logarithmic decibel addition. Based on logarithmic addition, a doubling of sound energy translates to a 3 dBA increase in noise (e.g., an increase from 65 dBA to 68 dBA represents a doubling of sound energy). Estimated onsite noise accounts for both vehicle traffic noise and railroad noise.

Construction noise and groundborne vibration levels were estimated based on information available in FTA's *Transit Noise and Vibration Impact Assessment* (May 2006). Reference noise and vibration levels from that document were used to estimate noise levels at nearby sensitive receptor locations based on the distance between the construction site and receptors and a standard noise attenuation rate of 6 dB per doubling of distance and vibration attenuation rate of approximately 9 VdB per doubling of distance. Construction noise and vibration level estimates do not account for the presence of intervening structures or topography, which could further reduce noise and vibration levels at receptor locations. Therefore, the noise and vibration levels presented herein represent a worst-case estimate of actual construction noise.

The following thresholds are based on Appendix G of the *CEQA Guidelines*. Impacts would be potentially significant if the Project would result in:

1. *Exposure of persons to or generation of noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies;*
2. *Exposure of persons to or generation of excessive groundborne vibration or groundborne noise levels;*
3. *A substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project;*
4. *A substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project;*
5. *For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, exposure of people residing or working in the project area to excessive noise levels; or*
6. *For a project within the vicinity of private airstrip, would the project expose people residing or working the project area to excessive noise levels.*

According to the City's *Environmental Thresholds and Guidelines Manual,* impacts would be significant if the Project would result in:

a) *Noise levels in excess of 65 dBA CNEL that could affect sensitive receptors;*
b) *Exposure to outdoor noise levels in excess of 65 dBA CNEL and/or exposure to interior noise levels in excess of 45 dBA CNEL.*
c) A substantial increase in ambient noise levels for noise-sensitive receptors generally presumed to be an increase to 65 dBA CNEL or more; or a substantial increase in ambient noise levels for noise-sensitive receptors that is less than 65 dBA CNEL, as determined on a case-by-case basis.
d) Noise from grading and construction activity proposed within 50 feet of sensitive receptors, including schools, residential development, commercial lodging facilities, hospitals, or care facilities.

With respect to traffic noise increases due to project-generated traffic, impacts would be significant if traffic-generated noise associated with development of the project would result in exposure of sensitive receptors to unacceptable noise levels, as outlined in Table 4.10-4, below. The May 2006 FTA *Transit Noise and Vibration Impact Assessment* recommendations were used to determine whether or not increases in roadway noise would be considered significant. The allowable noise exposure increase changes with increasing noise exposure, such that lower ambient noise levels have a higher allowable noise exposure increase. Table 4.10-4 shows the significance thresholds for increases in traffic-related noise levels caused by the project. If residential development or other sensitive receptors would be exposed to traffic noise increases exceeding the FTA criteria, impacts would be considered significant.

Table 4.10-4
Significance of Changes in
Operational Roadway Noise Exposure

Ldn or Leq in dBA	
Existing Noise Exposure	**Allowable Noise Exposure Increase**
45-50	7
50-55	5
55-60	3
60-65	2
65-75	1
75+	0

Source: FTA, May 2006

Goleta has not adopted specific thresholds for groundborne vibration impacts. Therefore, this analysis uses the FTA's vibration impact thresholds to determine whether groundborne vibration would be "excessive." A vibration velocity level of 75 VdB is the approximate dividing line between barely perceptible and distinctly perceptible levels for many people. The FTA does not consider most commercial and industrial uses to be noise-sensitive (except for those that depend on quiet as an important part of operations, such as sound recording studios) and therefore does not recommend thresholds for groundborne vibration impacts to such uses. In terms of groundborne vibration impacts on structures, the FTA states that groundborne vibration levels in excess of 100 VdB would damage fragile buildings and levels in excess of 95 VdB would damage extremely fragile historic buildings. According to FTA Transit Noise and Vibration Impact Assessment, the groundborne vibration threshold for "infrequent events," defined as fewer than 30 vibration events of the same kind per day, for residences and buildings where people normally sleep (e.g., the future onsite residences and the residences 50 feet south of the project site) is 80 VdB.

According to the Goleta General Plan, the project site is located outside of the current and the anticipated 2030 60 dBA CNEL noise contour of the Santa Barbara Municipal Airport. There are no private airports within the vicinity of the City. No impact related to airport noise would occur and airport noise impacts for Thresholds 5 and 6 are discussed in Section 4.15, *Effects Found Not to be Significant.*

b. Project Impacts and Mitigation Measures.

Impact N-1 **Construction activities would be located within 50 feet of sensitive receptors, including existing residential uses approximately 50 feet away along the southern project site border. Therefore, temporary construction-related noise could exceed City of Goleta Municipal Code Chapter 9.09 noise regulations. This impact would be Class I, *significant and unavoidable [Threshold 4].***

The Project would be constructed over a period of approximately 36 months, including the required soil hauling. Table 4.10-5 shows typical noise levels associated with various construction equipment at

distances of 50, 100, 200, 400, and 500 feet from the noise source. Typical construction noise levels at 50 feet from the source range from about 76 to 89 dBA. The grading/excavation phase of project construction tends to create the highest construction noise levels because of the operation of heavy earth-moving equipment, although only a limited amount of equipment would operate near a given location at a particular time. In the case of the Project, activity requiring the use of heavy earth-moving equipment would include the pre-construction soil removal phase.

Table 4.10-5
Typical Noise Levels at Construction Sites

Equipment Onsite	Typical Level (dBA) 50 Feet from the Source	Typical Level (dBA) 100 Feet from the Source	Typical Level (dBA) 200 feet from the Source	Typical Level (dBA) 400 feet from the Source	Typical Level (dBA) 500 feet from the Source
Air Compressor	81	75	69	63	61
Backhoe	80	74	68	62	60
Concrete Mixer	85	79	73	67	65
Crane, mobile	83	77	71	65	63
Dozer	85	79	73	67	65
Jack Hammer	88	82	76	70	68
Paver	89	83	77	71	69
Saw	76	70	64	58	56
Scraper Laying	89	83	77	71	69
Truck	88	82	76	70	68

Noise levels assume a noise attenuation rate of 6 dBA per doubling of distance.
Source: FTA, May 2006.

The most affected adjacent uses are residential uses (Willow Spring I and II) south of the project site across Camino Vista approximately 50 feet away. Adjacent industrial uses to the east could be exposed to temporary noise levels up to 89 dBA range during the loudest periods of construction. However, these types of facilities are not considered noise sensitive receptors. Since construction activities would be located within 50 feet of residential uses and noise at these receptors could exceed 89 dBA, the impact from construction noise would be potentially significant.

The Project would involve approximately 178,000-cubic yards of cut and 15,500-cubic yards of fill with approximately 115,000-cubic yards of export material, as described in Section 2.3.3. Trucks hauling material to and from the site would be a source of construction noise during this phase, which is anticipated to last up to 27 weeks as described in Section 2.0, *Project Description*.

As shown in Table 4.10-5, noise from trucks can reach up to 88 dBA at 50 feet from the source. The only available haul route from the Project site is Camino Vista to Los Carneros to U.S. 101 which would require trucks to pass by the existing Willow Spring I and II sites south of the project site across Camino Vista. Because hauling trucks would travel through residential neighborhoods and past sensitive receptors, noise levels from hauling activities may exceed 65 dBA and impacts would be potentially significant.

Mitigation Measures. Construction activity associated with the Project would occur within 50 feet of sensitive receptors and could therefore generate noise that exceeds City standards. Therefore, the following mitigation measures are required to minimize construction-related noise.

N-1(a) **Construction Timing.** Construction activity and equipment maintenance is limited to the hours between 8 AM and 5 PM, Monday through Friday. No construction can occur on State holidays (e.g., Thanksgiving, Labor Day). Non-noise generating construction activities such as interior painting are not subject to these restrictions.

Plan Requirements and Timing: At least one sign near each Project site entrance along Camino Vista stating these restrictions must be posted on the site. Signs must be a minimum size of 24" x 48." Signs must be in place before the beginning of and throughout grading and construction activities. Violations may result in suspension of permits.

Monitoring: The Planning and Environmental Review Director or designee must monitor compliance with restrictions on construction hours and must promptly investigate and respond to all complaints.

N-1(b) **Electrical Power.** Electrical power must be used to run air compressors and similar power tools.

Plan Requirements and Timing: The equipment area with appropriate acoustic shielding must be designated on building and grading plans.
Equipment and shielding must remain in the designated location throughout construction activities.

Monitoring: The Planning and Environmental Review Director or designee must periodically inspect the site to ensure compliance with all noise attenuation requirements.

N-1(c) **Construction Noise Complaint Line.** The applicant must provide a non-automated telephone number for local residents and employees to call to submit complaints associated with construction noise.

Plan Requirements and Timing: The telephone number must be included in the notice required by Measure N-1(a) and posted on the Project site and must be easily viewed from adjacent public areas. Proof of mailing the notices must be provided to the Planning and Environmental Review Director or designee before the City issues a grading permit. At least one sign near each Project site entrance along Camino Vista with the phone number must be posted onsite. The applicant must inform the Planning and Development Review Director or designee of any complaints within one week of receipt of the complaint. Signs must be in place before beginning of and throughout grading and construction activities. Violations may result in suspension of permits.

Monitoring: Building Inspectors and Permit Compliance staff may periodically inspect and respond to complaints.

N-1(d) **Distancing of Vehicles and Equipment.** Noise and groundborne vibration construction activities whose specific location on the Project site may be flexible (e.g., operation of compressors and generators, cement mixing, general truck idling) must be conducted as far as possible from the nearest noise- and vibration-sensitive land uses.

Plan Requirements and Timing. The location of vehicles and equipment must be designated on building and grading plans. Equipment and vehicles must remain in the designated location throughout construction activities.

Monitoring. The Planning and Environmental Review Director must periodically inspect the site to ensure compliance.

N-1(e) **Avoid Operating Equipment Simultaneously.** Whenever possible, construction activities must be scheduled so as to avoid operating several pieces of equipment simultaneously, which causes high noise levels.

Plan Requirements and Timing. The construction schedule and timing of operation of each piece of equipment must be provided by the applicant.

Monitoring. Planning and Environmental Review Director or designee must periodically inspect the site to ensure compliance.

N-1(f) **Sound Control Curtains and Acoustical Blankets.** Flexible sound control curtains must be placed around all drilling apparatuses, drill rigs, and jackhammers when in use. Acoustical blankets (or similarly effective temporary noise barriers) must be placed along the southern and eastern Project site boundaries to reduce noise transmission to existing land uses to the south and east, including residential units at the existing Willow Spring I and II sites south of the project site across Camino Vista.

Plan Requirements and Timing. The equipment area with appropriate sound control curtains and the locations of acoustical blankets must be designated on building and grading plans. Equipment and shielding must remain in the designated location throughout construction activities.

Monitoring. Planning and Environmental Review Director or designee must monitor compliance with restrictions on construction hours and must promptly investigate and respond to all complaints.

N-1(g) **Newest Power Construction Equipment.** The Project contractor must use the newest available power construction equipment with standard recommended noise shielding and muffling devices.

Plan Requirements and Timing. The equipment with appropriate noise shielding and muffling must be designated on building and grading plans.

Monitoring. The Planning and Environmental Review Director or designee must inspect the building and grading plans before the City issues permits and periodically inspect the site to ensure compliance.

Residual Impact. Project construction would represent a temporary source of noise to sensitive receptors adjacent to the Project site and along the route used by soil hauling trucks, which would impact existing residential units at the existing Willow Spring I and II sites south of the project site across Camino Vista. Mitigation Measures N-1(a) through N-1(g) require implementation of noise reduction devices and techniques during construction, and would reduce the noise levels associated with construction of the Project to the maximum extent feasible. Construction noise would be intermittent and temporary, and implementation of the maximum feasible construction noise reduction measures would reduce construction-related noise to the extent feasible. However, due to the fact that heavy construction equipment would be located as close to 50 feet from existing residential units, and the pre-construction soil hauling activity would result in heavy trucks passing existing residences along Camino Vista for up to 27 weeks, construction noise impacts would remain significant and unavoidable.

Impact N-2 **Project construction activities could generate intermittent levels of groundborne vibration affecting surrounding residential development. However, the expected vibration levels during temporary construction activity would not exceed applicable standards for infrequent vibration events. This impact would be Class III, *less than significant [Threshold 2].***

Construction activities that would occur at the Project site have the potential to generate low levels of groundborne vibration. Table 4.10-6 identifies various vibration velocity levels for the types of construction equipment that would operate at the Project site during construction activities.

Table 4.10-6
Vibration Levels for Construction Equipment

Equipment	Approximate VdB		
	25 Feet	50 Feet	100 Feet
Hoe Ram	87	78	69
Large Bulldozer	87	78	69
Caisson Drilling	87	78	69
Loaded Trucks	86	77	68
Jackhammer	79	70	61
Small Bulldozer	58	48	39

Source: FTA, Transit Noise and Vibration Assessment, May 2006.

As shown in Table 4.10-6, vibration levels could reach approximately 78 VdB at 50 feet from the Project site boundary. The Project would be adjacent to several general industrial uses, which are located approximately 50 feet east of the Project site. However, these structures do not include uses that would

be sensitive to vibration, and vibration levels would not exceed 100 VdB, which is the FTA threshold at which groundborne vibration levels may damage buildings.

The nearest residential uses are located 50 feet south of the Project site. As described above, the FTA groundborne vibration threshold for "infrequent events" (defined as fewer than 30 vibration events of the same kind per day), for residences and buildings where people normally sleep (e.g., the future onsite residences and the residences 50 feet south of the Project site) is 80 VdB. Activity during the construction period would not result in vibration levels that would exceed 80 VdB, and would not be expected to result in vibration levels that would be perceptible at nearby residences in excess of 30 vibration events of the same kind per day. Therefore, impacts associated with groundborne vibration would be less than significant.

Mitigation Measures. Mitigation is not required since this impact would be less than significant.

Residual Impact. Impacts would be less than significant without mitigation.

Impact N-3 **Project-generated traffic would incrementally increase traffic-related noise on study area roadway segments, which would potentially affect existing sensitive receptors on area roadways. However, the change in noise levels would not exceed significance thresholds. Therefore, the effect of increased traffic noise would be Class III, *less than significant [Threshold 3]*.**

The Project would generate an estimated 1,970 average daily vehicle trips to and from the site, including 174 AM peak hour trips and 183 PM peak hour trips (refer to the Project traffic study in Appendix I). These trips would incrementally increase traffic noise on study area roadways. The Project could therefore incrementally increase noise at neighboring uses, particularly uses located along Los Carneros Road, Camino Vista, Los Carneros Way, and U.S. 101. (Long-term noise impacts to the proposed new residences that would result from the Project are discussed below in Impact N-5.)

Estimated peak hour traffic values from the traffic study were used to model the change in noise levels resulting from increased traffic on eight traffic intersections. Table 4.10-7 indicates noise levels at the adjacent existing Willow Springs I and II residences to the south, a location at the Project site nearest Los Carneros Road, UPRR, and U.S. 101, and the location of the noise measurement performed by Dudek for this EIR. The noise measurement location was modeled to calibrate the model and ensure accuracy. The peak-hour noise measurement taken was 62 dBA Leq, while the Traffic Noise Model (TNM) for the same location (Roadway 3 in Table 4.10-7) produced a noise level of 62.8 dBA Leq.

Table 4.10-7
Calculated Exterior Noise Associated with Traffic on Surrounding Roadways During Peak Hour

Roadway	Projected Noise Level (dBA Leq)				Change In Noise Level (dBA Leq)	
	Existing	Existing + Project	Cumulative	Cumulative + Project	Due to Project Traffic	Due to Project Traffic Under Future Conditions
1. Camino Vista	62.1	63.8	64.1	65.1	1.7	1.0
2. South Los Carneros Road	65.9	66.1	67.4	67.5	0.2	0.1
3. U.S. 101	62.8	62.8	64.6	64.6	0.0	0.0

Refer to Appendix H for full noise model output. Noise levels presented do not account for attenuation provided by existing barriers or future barriers; therefore, actual noise levels at sensitive receptor locations influenced by study area roadways may in many cases be lower than presented herein.
Source: Federal Highway Administration Traffic Noise Model 2.5

As shown in Table 4.10-7, the highest noise level increase due to the Project would be 1.7 dBA under existing plus Project conditions at the existing Willow Springs I and II residential development to the south, which would be primarily affected by increased traffic on Camino Vista. Roadway noise increases associated with new traffic on South Los Carneros Road and U.S. 101 would be less than 1 dBA.

The increase in noise of 1.7 dBA under existing conditions and 1.0 dBA under cumulative conditions would be less than the applicable noise increase threshold of 2.0 dBA shown in Table 4.10-3. The 0.2 dBA noise increase under existing conditions and 0.1 noise increase under cumulative conditions on the Project site would be less than the applicable noise increase threshold of 1.0 dBA at this location. Therefore, impacts related to Project-generated traffic noise would be less than significant.

Mitigation Measures. Mitigation is not required since significant traffic noise increases would not occur along any study road segments.

Residual Impact. Impacts would be less than significant without mitigation.

Impact N-4 **Operation of the Project would generate noise typically associated with residential development. However, noise would not affect sensitive receptors and noise levels would not exceed City thresholds. Impacts would be Class III, *less than significant [Threshold 1].***

The new parking areas on the Project site would bring vehicular activity and associated parking lot noise to the site. These uses would result in increased noise at the industrial uses immediately adjacent to the Project site, and potential onsite noise conflicts between vehicular/parking activity and proposed residential units. Sources of noise would include general vehicular movement, periodic instantaneous sounds such as car honking and car alarms, and conversations. Table 4.10-8 shows exterior noise levels typically associated with parking lots. Noise levels at parking areas onsite could reach 72 dBA at 50 feet from the parking areas when street sweeping occurs, and 69 dBA when car alarms and car horns sound. However, these noise sources are sporadic and not usually anticipated as part of normal parking lot activity in a residential area. Noise levels from normal daily parking lot activity would not exceed 64 dBA.

Table 4.10-8
Parking Lot Noise Sources at 50 Feet

Source	Level (dBA)
Autos at 14 mph	50
Sweepers	72
Car Alarm Signal	69
Car Alarm Chirp	54
Car Horns	69
Door Slams	64
Talking	36
Radios	64
Tire Squeals	66

Source: Gordon Bricken & Associates, 1996. Estimates based on noise measurements taken at parking lots.

The Project would require maintenance associated with typical residential uses, such as lawn mowers, leaf blowers, and other landscaping equipment. Use of this outdoor equipment would generally be of short duration, and would not occur on a daily basis (landscaping activities would generally occur weekly or semi-weekly), and would occur during the daytime, when residential land uses are the least noise-sensitive; therefore these activities would not contribute substantially to the overall outdoor noise environment and would not be expected to cause noise levels to exceed 65 dBA CNEL.

The Goleta General Plan Noise Element requires that habitable rooms do not exceed interior noise levels of 45 dBA CNEL. As described in Section 4.10.1(a), standard construction materials and techniques used for residential developments in Southern California normally result in a minimum exterior-to-interior noise attenuation of 15 dBA with windows open and 20 dBA with windows closed. Factoring in this reduction, interior noise levels for residences would not exceed 45 dBA CNEL as long as the City's outdoor 65 dBA CNEL standard is not exceeded. Therefore, this impact would be less than significant.

Mitigation Measures. Mitigation is not required because impacts would be less than significant.

Residual Impact. Impacts would be less than significant without mitigation.

Impact N-5 **Construction of the Project near the Union Pacific Railroad, U.S. 101, and existing business park development could expose future residents on the project site to noise levels exceeding City standards. This impact would be Class II, *significant but mitigable [Threshold 1].***

The UPRR borders the Project site to the north. In addition, U.S. 101 is immediately north of the UPRR. Roadways border the Project site to the east and southwest. The Project would locate new residential units as close as 120 feet from the railroad tracks, 300 feet from the centerline of U.S. 101, and within 50 feet from the centerlines of the other adjacent roadways. Therefore, future residents could be exposed to noise produced by passenger and freight trains on the UPRR and from vehicle traffic on the U.S. 101 and surrounding roadways. The Project site is also bordered on the east by existing general industrial development. Future residents could be exposed to noise produced by vehicles, truck loading and unloading, forklifts, HVAC systems, and other mechanical units needed to support ongoing industrial park activities.

As shown in Table 4.10-1, existing long-term noise levels measured on site were 67 dBA CNEL, which exceeds the City of Goleta threshold of 65 dBA for noise-sensitive land uses. These noise measurements were collected during the day during normal operational hours for the adjacent industrial development. Therefore, future residents would be potentially exposed to noise levels above City standards. The Project would also include a masonry wall of approximately eight feet in height along the northern and western Project boundaries. These walls would attenuate noise associated with the U.S. 101 and the UPRR located north of the Project site, as well as industrial development located east of the Project site.

Table 4.10-9 shows estimated noise levels (CNEL) at the proposed residential buildings that would be most affected by noise from roadway and railroad noise (Buildings 3, 4, 5, 7, and 8) with the proposed eight-foot masonry wall. Noise levels were calculated for roadways and the UPRR, and were then combined for an estimate of the overall onsite CNEL. In Table 4.10-9, overall onsite noise levels estimated to exceed the City's exterior standard of 65 dBA are bolded.

Table 4.10-9
Highest Calculated Exterior Sound Levels (Cumulative Plus Project)
with Eight-Foot High Wall at Northern and Western Project Boundaries

Receiver	Roadway and Railroad CNEL With 8' Sound Wall		
	1st floor facade	2nd floor facade	3rd floor facade
Building 1	61	61	--
Building 2	61	61	--
Building 3	65	**66**	--
Building 4	**68**	**67**	--
Building 5	**68**	**67**	--
Building 6	57	57	60
Building 7	**68**	**68**	**72**
Building 8	**67**	**67**	**71**
Pool/Recreation Area	60	--	--

Only the highest sound levels for each building are shown. Sound levels calculated using Traffic Noise Model Version 2.5.

As shown in Table 4.10-9, with the proposed eight-foot masonry wall along the northern site boundary, the overall ground floor exterior combined CNEL associated with roadway and rail noise is estimated at 57 dBA for Building 6 to about 68 dBA for Building 7. The second floor CNEL for combined roadway and rail noise is estimated at 57 dBA for Building 6 to 68 dBA at Building 7. The third floor combined CNEL due to roadway and rail noise is projected to range from 60 dBA at Building 6 to 72 dBA at Building 7.

Overall, exterior levels are projected to exceed the City's 65 dBA CNEL exterior standard for noise sensitive uses at both the ground floor, second, and third floor of the most affected buildings onsite, including Buildings 3, 4, 5, 7, and 8. Exterior levels at other proposed buildings, which would be located farther from U.S. 101 and the UPRR and would be partially shielded by intervening buildings on the site, would be expected to remain within the 65 dBA CNEL standard. The exterior level at proposed exterior recreational spaces would remain within the acceptable range (up to 70 dBA CNEL) for recreational uses. Nevertheless, throughout the Project site, residents would be subject to periodic elevated noise levels

associated with trains passing on the UPRR. In particular, events occurring at night could be disturbing to residents.

Because exterior noise levels would exceed 65 dBA CNEL at the most affected residential units, impacts related to exposure of site residents to noise are potentially significant.

As described in Section 4.10.1(a), standard construction materials and techniques used for residential developments in Southern California normally result in a minimum exterior-to-interior noise attenuation of 15 dBA with windows open and 20 dBA with windows closed. Table 4.10-10 shows the estimated interior noise levels (CNEL) compared to the 45 dBA interior standard established by the City of Goleta General Plan Noise Element.

Table 4.10-10
Highest Calculated Exterior and Interior Sound Levels (Cumulative Plus Project) with Eight-Foot High Wall at Northern and Western Project Boundaries

	Roadway and Railroad CNEL With 8' Sound Wall			
	Calculated Interior Noise			Interior Standard Exceeded (45 dBA Leq)
Receiver	1st floor facade	2nd floor facade	3rd floor facade	
Building 1	41	41	--	No
Building 2	41	41	--	No
Building 3	45	**46**	--	**Yes**
Building 4	**48**	**47**	--	**Yes**
Building 5	**48**	**47**	--	**Yes**
Building 6	37	37	40	No
Building 7	**48**	**48**	**52**	**Yes**
Building 8	**47**	**47**	**51**	**Yes**
Pool/Recreation Area	40	0	--	No

Only the highest sound levels for each building are shown. Sound levels calculated using Traffic Noise Model Version 2.5.
***Bold text** indicates a potentially significant impact.*

With standard construction materials and techniques used for residential developments in Southern California, exterior-to-interior noise levels for Buildings 3 (2nd floor), 4 (1st and 2nd floors), 5 (1st and 2nd floors), 7 (1st, 2nd, and 3rd floors) and 8 (1st, 2nd, and 3rd floors) would not meet the City's 45 dBA CNEL standard, and would therefore exceed the acceptable interior noise level established in City of Goleta General Plan Noise Element. Impacts associated with exterior and interior noise conflicts at specific new residential units on the project site would be potentially significant.

Mitigation Measures. The following mitigation measures would be required to reduce exterior and interior noise levels to a less than significant level.

As shown in Table 4.10-9, balconies and patios of residential units located in Buildings 3, 4, 5, 7 and 8 that are facing U.S. 101 and/or the UPRR line may be subject to noise exceeding 65 dBA CNEL. Use of balconies is optional for residents living in these buildings and noise disturbance on these balconies can generally be avoided by residents limiting their use of these areas to times when noise levels are not

excessive. Nevertheless, Mitigation Measure N-5(a) would be required to ensure that noise levels in such areas do not exceed City standards.

N-5(a) Outdoor Living Area Noise Attenuation. Residential outdoor living spaces (e.g., patios and balconies) associated with all residential units located in the proposed Buildings 3, 4, 5, 7 and 8, facing U.S. 101 and/or the UPRR line, must be protected from sound intrusion so that they meet the City's standard of 65 dBA CNEL for outdoor living spaces. Patios and balconies for these residential units must include noise barriers up to seven feet in height to reduce traffic and train noise to meet the City's 65 dBA CNEL noise level criterion for exterior living areas. The noise barriers may be constructed of a material such as tempered glass, acrylic glass, or any masonry material with a surface density of at least three pounds per square foot. The noise barriers should have no openings or cracks.

Once building elevations and exterior design details are finalized, further noise evaluation should be performed in order to prescribe the height of necessary noise barrier per balcony area. Failure to conclusively demonstrate the effectiveness of the proposed noise attenuation measures must result in the denial of a permit to build the affected unit.

Plan Requirements and Timing: These requirements must be incorporated into all construction documents submitted for approval before the issuance of a Land Use Permit for all residential units in Buildings 3, 4, 5, 7 and 8 that are facing U.S. 101 and/or the UPRR line.

Monitoring: The Planning and Environmental Review Director, or designee, must verify compliance before the issuance of a Land Use Permit for all residential units in Buildings 3, 4, 5, 7 and 8 that are facing U.S. 101 and/or the UPRR line. City building inspectors must verify compliance in the field before the City issues a certificate of occupancy for an affected unit. No certificate of occupancy can be issued unless compliance is achieved.

As shown in Table 4.10-10, interior living spaces of Buildings 3, 4, 5, 7 and 8 that are facing U.S. 101 and/or the UPRR line may be subject to noise exceeding 45 dBA CNEL. Mitigation Measure N-5(b) would be required to ensure that interior noise levels do not exceed City interior noise standards.

N-5(b) Indoor Noise Attenuation. All residential units located in the proposed Buildings 3, 4, 5, 7 and 8 that are facing U.S. 101 and the UPRR rail line to the north and Los Carneros Road to the west must include windows with a minimum Sound Transmission Class (STC) rating of 28 STC, and forced-air mechanical ventilation or air conditioning systems, satisfactory to the local building official, to adequately ventilate the interior space of the units when windows are closed to control noise, and sound rated windows. Incorporation of these design requirements would be expected to achieve an exterior-to-interior noise level reduction of 25 dB or greater

Before the City issues building permits, the applicant must submit an interior noise study to be approved by the Planning and Environmental Review Director or designee. This interior noise study must analyze the residential units in the proposed Buildings 3, 4, 5, 7 and 8 that are facing U.S. 101, the rail line, and Los Carneros Road. The interior noise study must ensure compliance with the City's 45 dBA CNEL noise standard. Failure to conclusively demonstrate the effectiveness of the proposed noise attenuation measures will result in the City denying a building permit for the affected units.

Plan Requirements and Timing: These requirements must be incorporated into all construction documents submitted for approval before the issuance of a Land Use Permit for the residential units in Buildings 3, 4, 5, 7 and 8 that are facing U.S. 101, the UPRR line, or Los Carneros Road.

Monitoring: The Planning and Environmental Review Director, or designee, must verify compliance before the City issues a permit for the residential units in Buildings 3, 4, 5, 7 and 8 that are facing U.S. 101, the UPRR line, or Los Carneros Road. The City building inspectors must verify compliance in the field before the City issues a certificate of occupancy for an affected unit. No certificate of occupancy can be issued unless compliance is achieved.

Residual Impact. Noise reduction provided by the seven-foot barrier required by Mitigation Measure N-5(a) was calculated using methodology from the *Handbook of Noise Control*, 2nd Ed. (Harris, 1979) and height inputs from the Dudek Noise Study. As shown below in Table 4.10-11, the required seven-foot barriers would reduce exterior noise levels at all affected balconies and patios to levels below the City's 65 dBA threshold.

Table 4.10-11
Highest Calculated Exterior Sound Levels (Cumulative Plus Project)
with 7' Barriers at Balconies facing Northern Project Boundaries

	Roadway and Railroad CNEL						
	Exterior Noise			Calculated Reduced Exterior Noise With 7' Balcony Barrier			Exterior Standard Exceeded with Mitigation (65 dBA Leq)
Receiver	1st floor facade	2nd floor facade	3rd floor facade	1st floor facade	2nd floor facade	3rd floor facade	
Building 4	**68**	**67**	--	57	54	--	No
Building 5	**68**	**67**	--	57	54	--	No
Building 7	**66**	**69**	**72**	54	56	59	No
Building 8	**66**	**68**	**71**	54	55	58	No

Methodology Source: Harris, C.M. (1979), Handbook of Noise Control, 2nd. Ed.

As shown in Table 4.10-11, Mitigation Measure N-5 would achieve an acceptable exterior noise level in outdoor living spaces. With implementation of these measures, exterior and interior noise levels experienced by future residents on the Project site from traffic on U.S. 101 and the UPRR line would be reduced to a less than significant level.

Additionally, the following condition of approval to notify potential residents of the UPRR and U.S. 101 associated noise is recommended to further reduce impacts.

The applicant must provide a rail line real-estate disclosure to potential occupants, providing notice of the site's proximity to the UPRR and that associated noise and vibration may be perceptible.

Impact N-6 **Development of the Project near the UPRR could expose future residents to groundborne vibration generated by passing trains. However, because vibration levels would be below applicable thresholds, impacts would be Class III, *less than significant [Threshold 2].***

Table 4.10-12 shows the approximate VdB from passenger and freight trains at 30, 50, 100, 200, and 300 feet from the track centerline traveling at 50 miles per hour. The residential units closest to the train tracks would be approximately 105 feet from the track centerline. These are vibration levels at ground floor elevation. Upper level floors would experience less vibration due to dispersion and attenuation of the vibration energy as it propagates through a building. Vibration typically attenuates at a rate of 1 to 2 VdB per floor above ground level.

Table 4.10-12
Vibration Levels for Rail Transit

	Approximate VdB					
	30 Feet	**50 Feet**	**100 Feet**	**120 Feet**	**200 Feet**	**300 Feet**
Locomotive Powered Passenger or Freight Train (50 mph)	88	85	78	76	72	67

Source: FTA, Transit Noise and Vibration Assessment, May 2006.

Vibration levels at 105 feet would not exceed 78 VdB, which is below the structural damage threshold of 100 VdB and below the FTA threshold of 80 VdB for infrequent events to residential uses where people normally sleep. Therefore, at the proposed residential units 120 feet from the track centerline, impacts would be less than significant.

Mitigation Measures. Mitigation is not required as impacts would be less than significant.

Residual Impact. Impacts would be less than significant without mitigation.

c. Cumulative Impacts. Table 4.10-7 shows cumulative noise increases along roadways near the Project site due to cumulative traffic growth. Noise level increases along the traffic study roadway segments near sensitive receptors due to cumulative traffic would range between 0.1 and 1.0 dBA. This increase would not be significant based on the applicable FTA significance thresholds for each roadway/receptor (refer to Table 4.10-4). Therefore, the Project's contribution would not be cumulatively considerable or significant.

Construction and operation of other projects in the vicinity of the Project site would likely generate noise levels in excess of existing measured noise levels and may affect sensitive receptors. As described in Section 2.0, *Project Description*, there is a residential development with 465 residential units currently under construction on a formerly vacant site west of S. Los Carneros Road. When complete, these residences may be exposed to construction noise from the Project. Alternately, the construction of the Project may expose future sensitive receptors on the Project site to construction noise, depending on

which project is developed first. However, construction and operational noise would be localized and short-term in nature and would not contribute to cumulative noise impacts. With implementation of Mitigation Measures N-1(a) through N-1(g) and N-5, cumulative noise impacts would be reduced to a less than significant level.

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